Horticultural Product Technology (Quality Assessment)

**Aims:**

* To assess the quality of a number of different fruit and vegetables in terms of size, colour, firmness and their refractive index.
* To examine and identify the effects of time, temperature and different types of packaging on the quality of a number of fruit and vegetables.
* To determine what the best methods of storage are for certain fruit and vegetables.

**Introduction:**

The worldwide marketing of fruits and vegetables to keep up with the consumer’s demand for exotic produce and products that are out of season, presents a profitable marketing prospect for growers, and the market opportunities offered by the European Union are some of the most financially attractive. Entering into the EU market does however require obedience with strict regulatory international framework and EU importers and retailers must conform to the law. Retailers and consumers require products to be grown, handled, packaged and processed to the highest quality standards. The EU has set guidelines on the amount of contaminants, microorganisms, pesticides that are acceptable in fruit and vegetables. This ensures a good quality of produce and also safer produce. Although the legislation may only stand for the minimum for market entrance, a lot of the larger retailers and some wholesalers want suppliers to show compliance with independently verifiable private standards such as the European Retailers Protocol for Good Agricultural Practice (EUREPGAP) and the British Retail Consortiums (BRC) Global Technical Standard, because this is an effective way of verifying that suppliers have the necessary management and control systems in place.

Another ruling body presides over the marketing of horticultural products. The Department of Agriculture, Fisheries and Food is responsible for enforcing and ensuring compliance with the European Communities Marketing Standards for Fresh

Fruit and Vegetables, provided for by Council Regulation No. 2200/1996. The functions of these EC marketing standards for fresh fruit and vegetables are to guarantee that regulated produce accessible to the consumer is of the highest quality and accurately labelled. Only produce that meets the criteria is allowed progress to the market shelves.

The grading of fruit and vegetables is a very important process. As mentioned before, only produce that meets the strict criteria set out by the regulatory body will be allowed progress to the market shelves. It is those responsible for sorting grading and packing products to grade pass or reject produce for sale. It is their responsibility to re-grade or downgrade to a lower quality class any product, which may have deteriorated while in stock. Fruit and vegetables are classed as perishable products therefore grading and storing is of primary importance, followed closely by packing and transportation and/or processing.

Quality attributes of fresh fruits and vegetables can be sorted into three classes according to the amount of product characteristics when they are come across or consumed. These criteria are as follows:

**-**ExternalAppearance (sight): Visual evaluation of size, shape, gloss and colour

This may be accompanied by visual guides and colorimeters

-Feel (touch): refers to the manual evaluation of firmness and texture. This may be accompanied by mechanical texture analysis.

-Defects: Visual evaluation of absence of defects or deterioration of colour. This may be accompanied by mechanical methods (e.g. ultrasound).

**Internal**

**-**Smell: Mostly qualitative and individual evaluation by smelling.

-Taste: The sweetness, bitterness, sourness and saltiness etc

**-**Texture: Includes tenderness, firmness, crispness, crunchiness, chewiness and fibrousnesses which are measured by applying force to the produce; in addition, textural features are evaluated as “mouthfeel”.

**Hidden**

**-**Wholesomeness: freshness and how clean and hygienic the product is.

-Nutritive value: Nutritive value is measured by the content of nutrients such as fat carbohydrates, protein as well as essential vitamins, minerals and other substances that influence human well-being.

Food safety: measured by the inspection of food objects with regard to their pathogenic microbial load, content of chemical contaminants or presence of physical foreign matter in the produce.

External attributes of fruit and vegetables, are an important factor in a consumer's purchasing decision. Internal or hidden attributes usually only affects a consumer's decision to repurchase a product. The combination of external, internal and hidden attributes determines the overall acceptability of a product. In this lab a number of these quality attributes are assessed.

**Method:**

As per lab manual

**Results:**

***Table of results for the quality assessment of a number of different fruit and vegetables:***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Assessment of** | **Colour** | **Size (mm)** | **Firmness (lbs)** | **Refractive Index (Brix0)** |
| **Tomato** | **Stage 6 red** | **68** | **8.96** | **4.8** |
| **Banana** | **Stage 7 brown with some sugar spots** |  | **1.5** | **n/a** |
| **Cucumber** | **Dark green** |  | **10** | **3.75** |
| **Lettuce** | **Light green** | **130** | **8** | **2** |
| **Broccoli** | **Light green stalk, dark green head** | **77** | **24** | **n/a** |
| **Apple** | **Stage 4 red** | **Length:160**  **Width:75** | **10.5** | **12** |
| **Carrot** | **Orange** | **Big end:37**  **Small end:27** | **Over 27** | **n/a** |

***Table of results for cold storage 50C after 7 days:***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Fruit/Veg** | **Tin foil after 7 days** | **Paper after7 days** | **Open plastic MAP after 7 days** | **Plastic sealed after 7 days** | **Left out after 7 days** |
| **Tomato** | **Moist, no mould, not much colour change with a soft to firm texture** | **Slightly dry, no mould with a firm flesh** | **Soft, moist flesh, not much colour change, no mould** | **Moist with no discolouration or mould** | **Dried out, no mould and a lighter colour** |
| **Carrot** | **Hard with slight moisture loss and little colour change** | **spongy, darkened skin and loss of water** | **Not spongy and not much colour change** | **Not much moisture loss or colour change** | **Spongy, dried out slightly dark**  **flesh** |
| **Apple** |  |  |  |  |  |
| **Broccoli** | **Light green and firm, no mould** | **Still green, slight loss of colour and firmness** | **Dark green florets and a light yellow stem, still firm** | **No colour change, still firm, no loss in size** | **Slightly wilted soft florets, loss in colour** |
| **Lettuce** | **Less firm, retained colour** | **Patchy,dry,shrunk in size and lighter in colour** | **Same colour some brown spots and withered** | **Firm, slightly brown** | **Floppy, shrunk, dead and withered** |
| **Cucumber** |  |  |  |  |  |
| **Banana** |  |  |  |  |  |

***Table of results for ambient temperature 200C***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Fruit/Veg** | **Tin foil after 7 days** | **Paper after 7 days** | **Open plastic MAP after 7 days** | **Plastic sealed after 7 days** | **Left out after 7 days** |
| **Tomato** | **Blue and black mould, dark discolouration, soft flesh and skin** | **Dried out and smaller, bits of blue mould and a leathery skin** | **Soft to firm, loss of water, bluish mould on the inside and has become lighter in colour** | **Blue mould with a darker coloured soft skin** | **Loss of water with a leathery skin** |
| **Carrot** | **Slightly dry, no colour change** | **Spongy texture, very dry, blackened and a loss in mass** | **Slightly dry with not much colour change** | **Brownish discolouration, slightly dry with soft spots** | **Spongy texture, dried out and darkened outside** |
| **Apple** | **Brown** | **Brown spots and soft** | **Brown and soft** | **Brown and soft** | **Brown and soft** |
| **Broccoli** | **Brownish yellow crumbly head, light green but still firm stalk** | **Yellowy brown, very dry all over and shrivelled** | **Dry, green and firm** | **Very dry, crumbly head, dark green stalk and firm stalk** | **Completely dry and shrivelled and darker in colour** |
| **Lettuce** |  |  |  |  |  |
| **Cucumber** |  |  |  |  |  |
| **Banana** |  |  |  |  |  |

**The best method of storing:** 50 MAP bag left open

**Discussion:**

From the results we can see

**Say which storage method was the best and why,**

**Conclusion:**

The aims and objectives for this experiment were successfully carried out. The quality of a number of different fruit and vegetables in terms of size, colour, firmness and their refractive index were assessed. In week 2 of the experiment the effects of time, temperature and different types of packaging on the quality of these fruit and vegetables was examined and identified. Also, it was determined what the best methods of storage were for certain fruit and vegetables.